Math 300 A&B–Spring 2011 Syllabus

Mathematics seems to endow one with something like a new sense.
Charles Darwin

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Class Website: http://www.math.washington.edu/~nichifor/300S11.htm

Welcome to Math 300, Introduction to Mathematical Reasoning. Much of higher mathematics involves logical reasoning rather than plain calculations. This course is intended to bridge the gap between calculus-style classes and higher-level courses, giving you the opportunity to learn how to formulate mathematical arguments in an elementary mathematical setting. It emphasizes solid arguments and the writing of proofs, while introducing ideas of discrete mathematics and forming a foundation for more abstract mathematics.

This class is very different than the classes which precede it at UW. The accent is no longer on content and formulas (though you are expected to learn a certain amount of content too), but rather on solution-finding and proof-writing. **A great deal of emphasis will be placed on clarity, precision, and the communication of mathematics.** Homework and exam grading will reflect this emphasis. You should expect to dedicate a fair amount of time throughout each week to studying and thinking about your homework. Most ideas and problems considered will need time to “sink in”.

The textbook is An Introduction to Mathematical Reasoning: numbers, sets and functions by Peter J. Eccles. The sections assigned should be read carefully; the author does a good job of showing how to construct arguments.

There will be **one in-class midterm** exam on Friday, April 29, and **one final** exam as follows:

- Lecture A: on Monday, June 06, 8:30-10:20am
- Lecture B: on Wednesday, June 08, 2:30-4:20pm

A tentative class schedule is posted on the class website. Changes, if any, will be announced in class.

The **grade** breakdown is as follows:  

Homework = 35%, Midterm = 25%, Final = 40%.

**Homework** is the best way to learn and practice the content and the methods of the class. It consists of:

1. **Reading:** each assigned textbook section should be read carefully before class (or at least soon after.)
2. **Practice Problems:** Some of the assigned problems from the text have full solutions at the back of the book. For your own benefit, you should not read the solutions until you have discovered and written your own -- or until you have tried for a reasonable amount of time.
3. **Graded Team Problems:** The graded part of the homework will consist of problems which do not have solutions at the back of the book, or are not in the textbook. These are to be solved, written, and submitted in teams, as group homework. Hints can be obtained from me on request. There is also a discussion board for Math 300 (link on website).
   **Write-up:** To get high scores, you should not only solve all the listed problems, but also write neat, legible, clear, correct, complete, and convincing solutions. This means you may have to write a few drafts for each problem before the final version that you submit!

**Absences:**

If you miss class, you are responsible to know what was discussed or announced on the day you were absent. I recommend you get class notes from a classmate. If you have to miss the midterm due to a very serious, unavoidable, and documented reason, talk to me as soon as possible.

**Math 300 Resources:**

- Your textbook & the class website.
- Your team & your classmates.
- Office hours (posted on website and announced in class).
- Class discussion board (link on website).
<table>
<thead>
<tr>
<th>Week</th>
<th>Read:</th>
<th>Practice Homework (not graded):</th>
<th>Graded Team Homework</th>
<th>Collected next week on:</th>
</tr>
</thead>
</table>
| 1    | Chapters 1-3 (Prop Logic + Proofs) | Chapter 1: 1.2-1.4  
Chapter 2: 2.1 (i-iv), 2.3-2.6  
Chapter 3: 3.1 (ii), 3.2-3.3, 3.6-3.8 | Graded Hwk #1 | April 6 |
| 2    | Chapters 4-5 (Contradiction+Induction) | Chapter 4: 4.1-4.4, 4.6(i), 4.7  
Chapter 5: 5.1, 5.2, 5.4, 5.7(ii) | Graded Hwk #2 | April 13 |
| 3    | Chapter 6-7 (Sets + Quantifiers) | Chapter 6: 6.1(ii, iii), 6.3, 6.5, 6.6, 6.7  
Chapter 7: 7.1-7.2, 7.4 (i, ii, iv, v), 7.6-7.7 | Graded Hwk #3 | April 20 |
| 4    | Chapters 8-9 (Functions) | Chapter 8: 8.1, 8.2, 8.3, 8.5  
Chapter 9: 9.1, 9.2, 9.4, 9.5, 9.7 | Graded Hwk #4 | April 27 |
| 5    | Review | Review (MIDTERM) | | |
| 6    | Chapters 10-11 (Counting + Finite Sets) | Chapter 10: 10.1, 10.3, 10.4  
Chapter 11: 11.1-11.5 | Graded Hwk #5 | May 11 |
| 7    | Chapters 12-13 (Combinations, Permutations + Number Systems) | Chapter 12: 12.2-12.5  
Chapter 13: 13.1-13.5 | Graded Hwk #6 | May 18 |
| 8    | Chapters 14, 15.1, 16 (Infinite Sets + Euclidean Algorithm) | Chapter 14: 14.1, 14.2  
Chapter 15: 15.1 (i, ii, iv, vi, ix)  
Chapter 16: 16.1, 16.2, 16.4 | Graded Hwk #7 | May 25 |
| 9    | Chapters 19, 20, 24 (Congruences + FLT) | Chapter 19: 19.2-19.5  
Chapter 20: 20.1,20.2 | (Team Hwk #8) due June 1 | ----- |
| 10   | Catch up | Review | | |